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**Filed** : June 15, 2001

### **REMARKS**

The foregoing amendments to the claims, the accompanying *Request for Approval of Drawing Changes* and the following remarks are responsive to the October 23, 2002 Office Action. Applicants respectfully request the Examiner to consider the amended claims, the drawing changes and the following remarks and to pass this application to allowance.

#### **Discussion of the Requested Drawing Changes**

The Examiner requires Applicants to designate Figures 7-10 as prior art. In the accompanying *Request for Approval of Drawing Changes*, Applicants have revised Figures 7-10 as required by adding the legend --PRIOR ART--. No new matter is introduced by the added legend because the drawing figures are referenced as prior art in the specification.

The Examiner objects to the drawings under 37 CFR 1.83(a). The Examiner states that the drawings must show every feature of the invention specified in the claims. In particular, the Examiner states that the *magnetization direction of the permanent magnet* must be shown or the limitations *the bridges are inclined with respect to the magnetization of the permanent magnet* must be canceled from the claims. Although not stated by the Examiner, the cited limitation is in dependent Claims 4, 5 and 6 and in independent Claim 8.

In response to the objection to the drawings, Applicants have requested approval to change Figures 6(a), 6(b) and 6(c) to add dashed lines across the permanent magnets to show the direction of magnetization of the permanent magnets. As shown on the revised drawings, the lines showing the direction of magnetization are generally perpendicular to the arc of each permanent magnet, and the bridges in each of the figures are inclined with respect to the direction of magnetization.

No new matter is introduced by the requested drawing changes. The magnetic lines are explicitly shown in Figure 2, which illustrates the first embodiment of the invention. Paragraphs 0062 and 0063 explicitly relate the third embodiment of Figures 6(a), 6(b) and 6(c) to the first embodiment, thus disclosing to one skilled in the art that the third embodiment has corresponding directions of magnetization. Paragraph 0065 states that the bridges are inclined

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with respect to the direction of magnetization. Adding the lines as shown in the requested drawing changes shows what is taught by Figure 2 and paragraphs 0062, 0063 and 0065.

In view of the requested drawing changes and the foregoing remarks, Applicants respectfully request the Examiner to withdraw the objections to the drawings.

Formal drawings incorporating the requested drawing changes will be submitted when the drawing changes are approved.

### **Response to Rejection of Claims 2-3 Under 35 U.S.C. § 112, Second Paragraph**

The Examiner rejects Claims 2-3 under 35 U.S.C. § 112, second paragraph, as being indefinite. In particular, the Examiner states that the method of forming the bond magnets is not germane because the final product of a rotor formed by another process such as inserting or molding would serve the same function and have the same characteristics.

Applicants respectfully disagree with the Examiner's analysis. As described in the specification and as defined in Claim 3, which depends from Claim 2, the insides of the slits preferably have projections or recesses that engage the bond magnet when the bond magnet is solidified. See, for example, paragraph 0057. Thus, once solidified, the bond magnet is held firmly in the slits by the interaction of the projections or the recesses with the bond magnet. The Examiner's stated basis for rejection does not suggest how a solid bond magnet formed by another process can be inserted into the slits and engage the slits as disclosed and claimed by Applicants. Thus, such a solid bond magnet would not be held firmly in the slits and would therefore have different structural and functional characteristics.

In view of the foregoing, Applicants respectfully request the Examiner to withdraw the rejection of Claims 2-3 under 35 U.S.C. § 112, second paragraph.

### **Response to Rejection of Claims 1-2 Under 35 U.S.C. § 102(b)**

The Examiner rejects Claims 1-2 under 35 U.S.C. § 102(b) as being anticipated by JP 11262205 A2 to Narita et al. The Examiner also rejects Claims 1-2 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,225,724 to Toide et al. The Examiner contends that each reference shows each and every feature defined in Claims 1-2.

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Applicants have amended Claim 1 herein to more clearly define the slits as extending to and being open to the outer circumferential surface of the rotor as disclosed, for example, in paragraphs 0044 and 0047 of the present application. As described in paragraph 0047, when the slits are extended to the outer circumferential surface of the rotor, the regions of high flux density are not formed in the vicinity of the outer circumferential surface so that the flow towards the stator due to the permanent magnets is not disturbed.

Neither Narita nor Toide teaches or suggests that the slits extend to and are open to the outer circumferential surface of the rotor. In particular, both references have bridges between the ends of the slits and the outer circumferential surface of the rotor, and thus both references present the problem that Applicants' claimed invention solves. The two references teach away from the invention defined in Claim 1.

In view of the amendments to Claim 1 and the foregoing remarks, Applicants respectfully submit that neither cited reference anticipates Claim 1. Furthermore, as described in the present application, the extension of slits to the outer circumferential surface of the rotor such that the slits are open to the surface are non-obvious improvements over the two references that provide substantial benefits to the operation of the rotor. Applicants respectfully submit that amended Claim 1 is patentably distinguished over the two references. Applicants respectfully request the Examiner to withdraw the rejection of Claim 1 under 35 U.S.C. § 102(b) and to pass Claim 1 to allowance.

Claim 2 depends from Claim 1 and further defines the invention defined in Claim 1 as including a bond magnet in liquid form that fills the slit and is then solidified. In view of the patentability of Claim 1 as discussed above, Applicants respectfully submit that Claim 2 is likewise patentably distinguished over the cited references. Applicants respectfully request the Examiner to withdraw the rejection of Claim 2 under 35 U.S.C. § 102(b) and to pass Claim 2 to allowance.

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**Response to Rejection of Claim 3 Under 35 U.S.C. § 103(a)**

The Examiner rejects Claim 3 under 35 U.S.C. § 103(a) as being unpatentable over Narita or Toide in view of U.S. Patent No. 5,945,758 to Goltz et al. The Examiner contends that either Narita or Toide shows every aspect of the invention except the projections or recesses defined within the slits. The Examiner contends that Goltz teaches a rotor having a bond permanent magnet component surrounding and engaging a plurality of projections. The Examiner further contends that it would be obvious to combine the references.

Applicants respectfully disagree with the Examiner. Claim 3 depends from Claim 2 and further defines the invention defined in Claim 2. As discussed above, Claim 2, which depends from amended Claim 1, is patentably distinguished over both Narita and Toide. Goltz does not teach or suggest the slits extending to and being open at the outer circumferential surface of the rotor. Thus, Goltz does not provide the limitations missing from Narita and Toide. Therefore, Claim 3 is likewise patentably distinguished over Narita and Toide for the previously stated reasons.

Furthermore, Goltz cannot be combined with either Narita or Toide as proposed by the Examiner. Although Goltz is directed to a rotor for an electric motor, the magnet in Goltz is an outside magnet which is molded around a hub. There is no teaching or suggestion of a slit into which a liquid bond magnet is inserted and then solidified. Absent impermissible hindsight in view of Applicants' claimed invention, one skilled in the art being presented with the teachings of Narita or Toide directed to magnets in slits in a rotor core would not consider combining the teachings of Goltz directed to an outside magnet that surrounds a hub. Even in view of such impermissible hindsight, the Examiner has not indicated how the teaching of Goltz, in which the magnet is formed around a hub, can be applied to the structure of magnets formed in the slits of a rotor as claimed by Applicants.

Claim 3 is amended herein to correct a grammatical error. The scope of Claim 3 is not affected by the amendment.

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In view of the foregoing remarks, Applicants respectfully submit that Claim 3 is patentably distinguished over the cited references. Applicants respectfully request the Examiner to withdraw the rejection of Claim 3 under 35 U.S.C. § 103(a) and to pass Claim 3 to allowance.

**Response to Rejection of Claims 5-6 and Claim 4 Under 35 U.S.C. § 103(a)**

The Examiner rejects Claims 5-6 under 35 U.S.C. § 103(a) as being unpatentable over Narita or Toide as applied to Claims 1-2 in further view of the level of ordinary skill in the art. The Examiner rejects Claim 4 under 35 U.S.C. § 103(a) as being unpatentable over Narita or Toide in view of Goltz as applied to Claim 3 in further view of the level of ordinary skill in the art. In particular, the Examiner states that having the slits inclined with respect to the direction of magnetization is an obvious modification of the size and shape of the bridges within the level of ordinary skill in the art.

Applicants respectfully disagree with the Examiner's rejection. Claims 5-6 and Claim 4 depend from Claim 1, either directly or via intervening claims, and further define the inventions defined in the respective claims from which they depend. In view of the patentability of the claims and any intervening claims, as discussed above, Applicants respectfully submit that Claims 5-6 and Claim 4 are likewise patentably distinguished over the cited references.

Applicants further submit that the Examiner's rejection is based on the unsupported contention that having the slits inclined with respect to the direction of magnetization is simply a design choice. As described in the application with respect to Figures 6(a), 6(b) and 6(c), Applicants have discovered that inclining the bridges provides the benefit of having longer lengths for the bridges so that the magnetic resistance is increased without decreasing the strength of the bridges. Increasing the magnetic resistance decreases the leakage flux and provides an effective utilization of the permanent magnets. See, for example, paragraph 0065.

The Examiner points to no teaching or suggestion in any of the references that the bridges should be lengthened to increase the magnetic resistance so that the leakage flux is reduced. Absent such a teaching or suggestion, there is no reason why a person of ordinary skill in the art would consider positioning the bridges in any other manner than the conventional manner shown

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in the cited references. The Examiner is again using impermissible hindsight based on Applicants' claimed invention to support the obviousness rejection when there is no support for the rejection in the cited references or elsewhere in the prior art.

In view of the foregoing remarks, Applicants respectfully submit that Claims 5-6 and Claim 4 are patentably distinguished over the cited references. Applicants respectfully request the Examiner to withdraw the rejections of Claims 5-6 and Claim 4 under 35 U.S.C. § 103(a) and to pass Claims 5-6 and Claim 4 to allowance.

#### **Response to Rejection of Claim 7 Under 35 U.S.C. § 103(a)**

The Examiner rejects Claim 7 under 35 U.S.C. § 103(a) as being unpatentable over JP 9-266646 to Takahashi in view of Goltz. The Examiner contends that Takahashi discloses the claimed invention except for the projections or recesses formed in the slits to engage the bond magnet. The Examiner further contends that Goltz teaches projections and that it would be obvious to combine Goltz with Takahashi.

Applicants respectfully disagree with the Examiner's contentions. In particular, Applicants have amended Claim 7 herein to more clearly define the slits as extending to and being open to the outer circumferential surface of the rotor. Takahashi does not teach or suggest that the slits extend to and are open to the outer circumferential surface of the rotor. In particular, Takahashi has bridges between the ends of the slits and the outer circumferential surface of the rotor. The bridges of Takahashi present the problem that Applicants' claimed invention solves. Thus Takahashi teaches away from the invention defined in Claim 7.

In view of the amendments to Claim 7 and the foregoing remarks, Applicants respectfully submit that Takahashi does not teach the slit structure defined Claim 7. Goltz does not teach the structural limitations missing from Takahashi. Thus, Applicants respectfully submit that Claim 7 is patentably distinguished over the proposed combination of Takahashi and Goltz. Furthermore, as discussed above, Goltz does not teach the limitations with respect to the engagement of projections or recesses with a liquid bond magnet material that solidifies after filling the slit.



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For the foregoing reasons, Applicants respectfully submit that Claim 7 is patentably distinguished over Takahashi and Goltz. Applicants respectfully request the Examiner to withdraw the rejection of Claim 7 under 35 U.S.C. § 103(a) and to pass Claim 7 to allowance.

**Response to Rejection of Claim 8 Under 35 U.S.C. § 103(a)**

The Examiner rejects Claim 8 under 35 U.S.C. § 103(a) as being unpatentable over Narita or Toide in view of the level of ordinary skill in the art. The Examiner contends that either reference teaches bridges across the slits and that the level of ordinary skill in the art would make it obvious to incline the bridges with respect to the direction of magnetization of the permanent magnets.

As discussed above, Applicants respectfully disagree with the Examiner's rejection based on the level of ordinary skill in the art with respect to the inclination of the magnets. There is no teaching or suggestion in the art to incline the bridges to make the bridges longer so that the magnetic resistance is increased without reducing the strength of the bridges. Absent such a teaching or suggestion, one skilled in the art would orient the bridges as shown in the cited references. The Examiner's rejection is based on impermissible hindsight and should be withdrawn.

In view of the foregoing remarks, Applicants respectfully submit that Claim 8 is patentably distinguished over the proposed combinations of the cited references and the level of ordinary skill in the art. Applicants respectfully request the Examiner to withdraw the rejection of Claim 8 under 35 U.S.C. § 103(a) and to pass Claim 8 to allowance.

**Summary**

In view of the accompanying drawing changes, the amendments to Claims 1, 3 and 7 and the foregoing remarks, Applicants respectfully submit that each of the Examiner's objections and rejections has been fully traversed. Applicants further submit that the present application is now in condition for allowance, and Applicants respectfully request allowance of Claims 1-8.

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**Request for Telephone Interview**

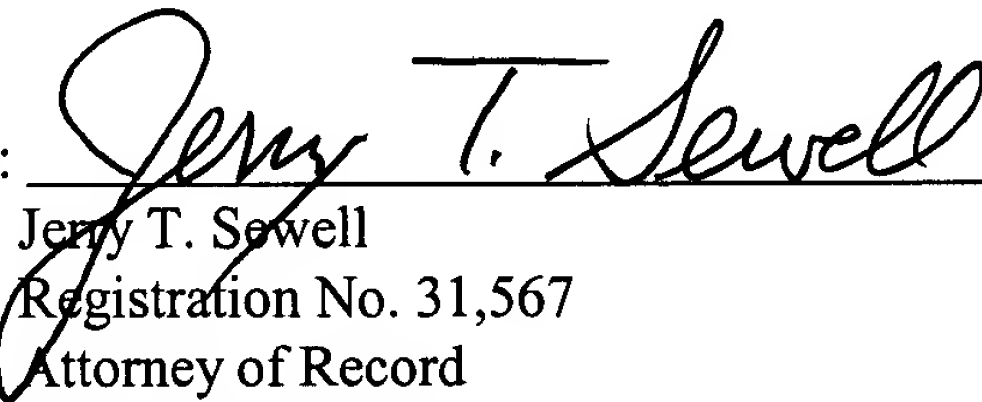
Applicants have made every effort to place this application in condition for allowance. If any question or issue arises that may be resolved via a telephone conference, Applicants respectfully request the Examiner to call the undersigned attorney of record at 949-721-2849 or at the number listed below.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: JANUARY 23, 2003

By: \_\_\_\_\_



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**Version with Markings to Show Modifications  
Under 37 C.F.R. § 1.121(c)(ii)**

The changes made to the claims in the current amendment are shown below. Insertions appear as underlined text, for example, insertions, while deletions appear as **bold text surrounded by brackets, for example, [deletions]**.

**IN THE CLAIMS:**

Please amend Claims 1, 3 and 7 as shown below:

1. (Amended) A permanent magnet rotor, comprising:  
a rotor core having a circumferential surface;  
a plurality of slits formed in the rotor core, each slit having a first end and a second end that extend to and are open to the circumferential surface of the core, each slit having a radially outward side and a radially inward side, each slit having a longitudinal middle portion between the first end and the second end at which a portion of the rotor core forms a bridge across the slit to interconnect a portion of the rotor core on the radially outward side of the slit with a portion of the rotor core on the radially inward portion of the slit; and  
a permanent magnet embedded in each slit.
3. (Amended) The permanent magnet rotor of Claim 2, wherein each slit has inside surfaces, and wherein the inside surfaces of each slit **[has]** have projections or recesses formed thereon, which projections or slots are adapted to engage with the bond magnet when the bond magnet is solidified.
7. (Amended) A permanent magnet rotor, comprising:  
a rotor core having a circumferential surface;  
a plurality of slits formed in the rotor core, each slit having a respective first end and a respective second end that extend to and are

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open to the circumferential surface of the rotor core, each slit having inner surfaces, each inner surface having projections or recesses formed thereon, each slit having a respective radially outward portion of the rotor core on one side of the slit and having a respective radially inward portion of the rotor core on an opposite side of the slit; and

a permanent magnet embedded in each slit by filling each slit with bond magnet that solidifies, the bond magnet engaging the projections or recesses when solidified to interconnect the respective radially outward portion of the rotor core on the one side of the slit with the respective radially inward portion of the rotor core on the opposite side of the slit.